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### REMARKS

Claims 1-12 are all the claims presently pending in the application.

While Applicants believe that all of the claims are patentable over the prior art of record, to expedite prosecution, claims 1 and 8 are amended to define more clearly and particularly the features of the present invention. Claims 1-8 also have been amended to make editorial amendments in conformance with U.S. patent practice.

New claims 9-12 have been added to claim additional features of the invention.

No new matter is added.

It is noted that the claim amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability. Further, Applicants specifically state that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Claims 3-7 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite

Claims 1, 2, and 8 stand rejected under 35 U.S.C. §102(b) as being anticipated by Ota (WO 02/054503).

These rejections are respectfully traversed in the following discussion.

#### **I. THE CLAIMED INVENTION**

Conventional light emitting devices allow the wavelength conversion of light emitted from a light emitting element by a phosphor material to obtain a desired emission color. In such conventional light emitting devices, the phosphor material in phosphor

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layer is excited by ultraviolet light emitted from the light emitting element and, thereby, it radiates, e.g., white light.

However, in the conventional light emitting devices the phosphor layer is exposed, and therefore, the phosphor material may be subjected to degradation due to absorbed moisture. On the other hand, if an air-tight housing is employed to prevent the penetration of water into the cover, the manufacturing cost will rise since the light emitting device becomes difficult to assemble. Thus, in conventional devices, it is difficult to sufficiently prevent moisture from causing degradation the phosphor material (e.g., see specification at page 1, lines 15-29, and page 2, lines 1-14).

Also, in the conventional devices, it is difficult to make the thickness of phosphor layer equal. Thus, it is difficult to generate equal fluorescence over the entire cover in conventional devices (e.g., see specification at page 2, lines 15-20).

The claimed invention, on the other hand, provides a light emitting device in which the degradation of phosphor material due to moisture can be prevented, and equal fluorescence also can be obtained over its entire emission surface (e.g., see specification at page 2, lines 23-28).

According to the claimed invention, the phosphor glass comprises a basic glass component doped with a fluorescence activation element (e.g., see specification at page 6, lines 3-7). It is noted that the present application defines "*phosphor glass*" such that the "*fluorescence activation element*" is included as a glass component (e.g., see page 6, lines 3-4). That is, the "*fluorescence activation element*" is not merely mixed into the glass.

For example, independent claim 1 exemplarily defines a light emitting device, including a light emitting element and a phosphor layer that is composed of phosphor glass to generate fluorescence while being excited by light emitted from the light emitting

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element. The light emitting element emits ultraviolet light, and the phosphor glass generates visible fluorescence while being excited by the ultraviolet light. The phosphor glass includes a low-melting phosphor glass doped with a fluorescence activation element.

On the other hand, independent claim 8 exemplarily defines a light emitting device, including a light emitting element, an optical system that converges light emitted from the light emitting element, wherein the optical system is composed of phosphor glass, and the phosphor glass comprises a low-melting phosphor glass doped with a fluorescence activation element.

According to the claimed invention, since the fluorescence activation element is incorporated into the glass structure, it can be stabilized to moisture (e.g., see specification at page 7, lines 11-13). Thus, the claimed invention can provide a light emitting device in which the degradation of phosphor material due to moisture can be prevented, and equal fluorescence also can be obtained over its entire emission surface (e.g., see specification at page 2, lines 23-28).

That is, in a light emitting device according to the exemplary aspects of the claimed invention, ultraviolet light emitted from the light emitting element can excite a phosphor element in the cover to generate fluorescence. According to the exemplary aspects of the claimed invention, the phosphor element can be evenly doped in phosphor glass to form the cover. Thus, the fluorescence can be generated evenly and, therefore, unevenness in emission color can be prevented. Moreover, since the phosphor element is part of the glass material, the phosphor element is prevented from being subjected to degradation due to moisture. Thus, the light emitting device according to the exemplary

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aspects of the claimed invention can provide excellent endurance (e.g., see specification at page 13, lines 10-18).

## II. REJECTION UNDER 35 U.S.C. § 112

Claims 3-7 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

### A. Claims 3 and 5:

Particularly, in claim 3, line 4, the Examiner alleges that the plurality of layers that are of “different kinds” of phosphor glasses are not defined, and thus, it allegedly is not clear as to what are the “different kind” of phosphor glasses. The Examiner raises a similar rejection in claim 5.

Applicants respectfully submit, however, that the plurality of layers including different kinds of the phosphor glasses clearly is described in the specification in such a way that one of ordinary skill in the art would know and understand the metes and bounds of the claimed invention.

It is noted that 35 U.S.C. § 112, second paragraph, rejections are directed to whether the claims are vague and/or indefinite to one of ordinary skill in the art of the invention.

Indeed, Applicants must define the subject matter with a reasonable degree of particularity and distinctness. Definiteness of claim language must be analyzed, not in a vacuum, but in light of (a) the content of the particular application disclosure, (b) the teachings of the prior art; and (c) the claim interpretation that would be given by one

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possessing the ordinary level of skill in the pertinent art at the time the invention was made (e.g., see M.P.E.P. § 2173.02).

Clearly, one of ordinary skill in the art would know and understand what is meant by a phosphor layer including a plurality of layers of different kinds of phosphor glasses, in view of the clear descriptions in the specification and drawings. In fact, the specification clearly describes the different kinds of phosphor glasses (e.g., see specification at page 6, lines 3-24; page 7, lines 14-29; page 8, lines 1-21) with sufficient detail such that the ordinarily skilled artisan would clearly know and understand the metes and bounds of the claimed invention.

For example, the present application clearly discloses that the phosphor layer exemplarily can include stacking different kinds of phosphor glass layers. That is, by mixing fluorescence's generated from the phosphor glass layers, the emission color of light emitting device can be arbitrarily controlled. For example, when stacked phosphor glasses of Tb<sup>3+</sup> (green system fluorescence), Eu<sup>2+</sup> (blue system fluorescence) and Eu<sup>3+</sup> (red system fluorescence) are applied to an ultraviolet light emitting element, fluorescence's generated from the phosphor glasses are mixed to produce white light (e.g., see specification at page 7, lines 14-22).

Thus, the features of claims 3 and 5 would be clear and definite to the ordinarily skilled artisan, and therefore, the Examiner is requested to reconsider and withdraw this rejection.

Again, the test for definiteness under 35 U.S.C. § 112, second paragraph, is whether "those skilled in the art would understand what is claimed when the claim is read in light of the specification" Orthokinetics, Inc. v. Safety Travel Chairs, Inc., 806 F.2d 1565, 1576, 1 USPQ2d 1081, 1088 (Fed. Cir. 1986)(see also M.P.E.P. § 2173.02).

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Also, Applicants submit that, in view of the clear description of these features of the claimed invention in the specification, the Examiner properly should have conducted a meaningful examination of claims 3 and 5 to avoid piecemeal examination, as specifically outlined in M.P.E.P. § 2173.06.

However, since claims 3 and 5 have not been examined in view of the prior art, in accordance with M.P.E.P. § 2173.06, Applicants submit that, if the Examiner rejects these claims on prior art grounds, then the next Office Action should be made non-final.

**B. Claims 4, 6, and 7:**

With respect to claim 4, line 3, i.e., the phosphor glass being “particle-shaped”, the Examiner alleges that it is unclear what exactly is “particle-shape”, since a shape of “particle-shape” is not known.

Applicants again note that 35 U.S.C. § 112, second paragraph, rejections are directed to whether the claims are vague and/or indefinite to one of ordinary skill in the art of the invention. Indeed, Applicants must define the subject matter with a reasonable degree of particularity and distinctness. Definiteness of claim language must be analyzed, not in a vacuum, but in light of (a) the content of the particular application disclosure, (b) the teachings of the prior art; and (c) the claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made (e.g., see M.P.E.P. § 2173.02).

Again, the test for definiteness under 35 U.S.C. § 112, second paragraph, is whether “those skilled in the art would understand what is claimed when the claim is read in light of the specification” Orthokinetics, Inc. v. Safety Travel Chairs, Inc., 806 F.2d 1565, 1576, 1 USPQ2d 1081, 1088 (Fed. Cir. 1986)(see also M.P.E.P. § 2173.02).

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Applicants respectfully submit, however, that the phosphor glass being “particle-shaped” clearly is described in the specification in such a way that one of ordinary skill in the art would know and understand the metes and bounds of the claimed invention.

Clearly, one of ordinary skill in the art would know and understand what is meant by the phosphor glass being “particle-shaped” in view of the clear descriptions in the specification and drawings. In fact, the specification clearly describes the particle-shaped phosphor glass (e.g., see specification at page 7, lines 23-29; page 8, lines 1-10) with sufficient detail such that the ordinarily skilled artisan clearly would know and understand the metes and bounds of the claimed invention.

For example, the present application exemplarily defines that “*a particle of phosphor glass means a particle to be obtained by grinding a bulk of phosphor glass, and its shape may be in various forms such as particle, powder and flake*” (see specification at page 8, lines 8-10).

Thus, the features of claim 4 would be clear and definite to the ordinarily skilled artisan, and therefore, the Examiner is requested to reconsider and withdraw this rejection.

Again, the test for definiteness under 35 U.S.C. § 112, second paragraph, is whether “those skilled in the art would understand what is claimed when the claim is read in light of the specification” Orthokinetics, Inc. v. Safety Travel Chairs, Inc., 806 F.2d 1565, 1576, 1 USPQ2d 1081, 1088 (Fed. Cir. 1986)(see also M.P.E.P. § 2173.02).

Also, Applicants submit that, in view of the clear description of these features of the claimed invention in the specification, the Examiner properly should have conducted a meaningful examination of claim 4 to avoid piecemeal examination, as specifically outlined in M.P.E.P. § 2173.06.

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However, since claim 4 has not been examined in view of the prior art, in accordance with M.P.E.P. § 2173.06, Applicants submit that, if the Examiner rejects claim 4 on prior art grounds, then the next Office Action should be made non-final.

**C. No Examination of Claims 3-7:**

Regarding claims 3-7, the Examiner alleges that claims 3-7 are informal (see rejection of claims under 35 U.S.C. § 112, second paragraph) such that no meaningful examination can be undertaken at this time. See MPEP 702.01. Note, claims 6-7 are dependent on rejected claim 4.

Applicants submit that, in view of the clear description of these features of the claimed invention in the specification, which the Examiner clearly could have used to interpret the meaning of the claims, the Examiner properly should have conducted a meaningful examination of claims 3-7 to avoid piecemeal examination, as specifically outlined in M.P.E.P. § 2173.06.

Indeed, even assuming *arguendo* that the features of the “*phosphor glass*” defined by claims 3-5, as mentioned by the Examiner, could be considered to be indefinite, there clearly are other features of claims 3-7 which are clear and definite and which properly should have been examined on the merits in view of the prior art *to avoid piecemeal examination* of the application.

For example, claims 6 and 7 clearly further define the features of the “*phosphor layer*” and the “*transparent material*”, according to the claimed invention. Thus, the Examiner properly should have examined these definite features in view of the prior art to avoid piecemeal examination as specifically outlined in M.P.E.P. § 2173.06.

However, since claims 3-7 have not been examined in view of the prior art, in accordance with M.P.E.P. § 2173.06, Applicants submit that, if the Examiner deems that



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a rejection of claims 3-7 on prior art grounds is proper (i.e., piecemeal examination), then the next Office Action properly should be made non-final to provide Applicants with a first opportunity to rebut such rejections.

### III. THE PRIOR ART REJECTION

Claims 1, 2, and 8 stand rejected under 35 U.S.C. §102(b) as being anticipated by Ota.

The Examiner alleges that Ota discloses or suggests all of the features of the claimed invention.

While Applicants believe that all of the claims are patentable over the prior art of record, to expedite prosecution, independent claims 1 and 8 are amended to define more clearly and particularly the features of the present invention.

For example, independent claim 1 recites, *inter alia*, a light emitting device, including:

*a light emitting element; and  
a phosphor layer that is composed of phosphor glass to  
generate fluorescence while being excited by light emitted from  
the light emitting element;  
wherein the light emitting element emits ultraviolet light,  
and the phosphor glass generates visible fluorescence while  
being excited by the ultraviolet light, and  
the phosphor glass comprises a low-melting phosphor  
glass doped with a fluorescence activation element (emphasis  
added).*

Somewhat similarly, independent claim 8 recites, *inter alia*, that “*the phosphor glass comprises a low-melting phosphor glass doped with a fluorescence activation element*” (emphasis added).

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According to the claimed invention, the phosphor glass includes a low-melting phosphor glass doped with a fluorescence activation element (e.g., see specification at page 6, lines 3-7; page 13, lines 13-14; and page 14, lines 16-18).

Hence, the phosphor layer of the invention is partially or entirely formed of a low-melting phosphor glass doped with a fluorescence activation element, as claimed in claims 1 and 8.

The phosphor glass comprises a basic glass component doped with a fluorescence activation element (e.g., see specification at page 6, lines 3-7). It is noted that the present application defines “*phosphor glass*” such that the “*fluorescence activation element*” is included as a glass component (e.g., see page 6, lines 3-4). That is, the “*fluorescence activation element*” is not merely mixed into the glass.

Therefore, the optical properties of the claimed phosphor glass of the present invention clearly are different than the optical properties of the “fluorescence activation element”-mixed glass, as disclosed by Ota. For example, the claimed phosphor glass is substantially colorless and transparent under visible light and generates more intensive fluorescence than “fluorescence activation element”-mixed glass (e.g., see specification at page 6, lines 14-17), while the “fluorescence activation element”-mixed glass of Ota would be clouded or opaque under visible light.

Furthermore, the phosphor glass of the claimed invention is formed of a low-melting phosphor glass, as recited in claims 1 and 8.

Therefore, the present invention provides an important advantage in that the phosphor glass can be easily molded so that freedom in designing can be enhanced, or improved.

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In comparison, Ota clearly does not disclose or suggest the use of the “*phosphor glass*” in light emitting device, as claimed. Instead, a phosphor layer of Ota is formed of the “fluorescence activation element”-mixed glass, i.e., low-melting glass 8 with divalent europium activated phosphor 11 mixed therein.

Therefore, the phosphor layer of Ota clearly would be clouded or opaque under visible light due to the mixed phosphor 11 and it only generates less intensive fluorescence than the claimed “*phosphor glass*”.

For the foregoing reasons, Ota does not disclose or suggest all of the features of independent claims 1 and 8.

Moreover, claims 2-7 also are patentable over Ota by virtue of their dependency from claim 1, as well as for the additional features recited therein.

Indeed, the Examiner has not identified how or where Ota discloses the features of claims 2-7. Moreover, as mentioned above, the Examiner has not examined claims 3-7 based on prior art grounds.

Applicants submit that Ota clearly does not disclose or suggest all of the features of claims 2-7, and indeed, the Office Action does not establish a *prima facie* case with respect to claims 2-7.

For example, Ota does not disclose or suggest that the phosphor glass includes, as glass component, at least one of Tb<sup>3+</sup> (terbium), Eu<sup>2+</sup> (divalent europium) and Eu<sup>3+</sup> (trivalent europium), as recited in claim 2.

Ota also clearly does not disclose or suggest that the phosphor layer includes a plurality of layers including different kinds of the phosphor glasses, as recited in claim 3.

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Ota clearly does not disclose or suggest that the phosphor glass includes a particle-shape, and the phosphor layer includes the transparent material and the particle-shaped phosphor glass that is dispersed in the transparent material, as recited in claim 4.

Ota clearly does not disclose or suggest that the particle-shaped phosphor glass includes different kinds of the particle-shaped phosphor glasses, as recited in claim 5.

Ota clearly does not disclose or suggest that the phosphor layer includes a phosphor material other than the phosphor glass, the phosphor material being dispersed in the transparent material, as recited in claim 6. Indeed, Ota does not mention this feature.

Ota clearly does not disclose or suggest that the transparent material includes at least one of low-melting glass and synthetic resin, as recited in claim 7. Indeed, the Examiner relies on the low-melting glass of Ota for teaching the phosphor glass. On the other hand, Ota does not disclose or suggest the phosphor glass in combination with resin layer 8. Instead, Ota discloses only one or the other.

For the foregoing reasons, Ota does not disclose or suggest all of the features of the claimed invention. Therefore, the Examiner is requested to reconsider and withdraw this rejection of claims 1, 2, and 8, and to permit claims 1-8 to pass to immediate allowance.

#### IV. NEW CLAIMS

New claims 9-12 are added to provide more varied protection for the present invention, as exemplarily described in the original specification and Figures of the present application.

Applicants submit that claims 9-12 are patentable over the prior art of record for somewhat similar reasons as those set forth above with respect to claims 1-8.

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For example, the prior art of record does not disclose or suggest that “*the low-melting phosphor glass comprises a fluorophosphate glass*”, as recited in claim 9.

The present invention discloses that the phosphor glass is composed such that an element having fluorescence activity, such as a rare-earth element, is doped into a basic glass component such as fluorophosphate (e.g., see specification at page 6, lines 3-7).

The prior art of record also does not disclose or suggest that “*the phosphor layer (or optical system) is entirely formed of phosphor glass comprising a basic glass component doped with a fluorescence activation element*”, as recited in claims 10 and 12 (e.g., see specification at page 6, lines 3-7; page 13, lines 5-8; page 18, lines 17-18; see also Figure 3).

For at least the foregoing reasons, Applicant submits that claims 9-12 are patentable over the prior art of record. Therefore, the Examiner is requested to permit claims 9-12 to pass to immediate allowance.

## V. FORMAL MATTERS

The Examiner is requested to acknowledge receipt of and approve the formal drawings filed on June 16, 2004, in the next official Action.

Applicants note that minor spelling errors also have been corrected in the specification.

## VI. CONCLUSION

In view of the foregoing, Applicants submit that claims 1-22, all the claims presently pending in the application, are patentably distinct over the prior art of record

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and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

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**CERTIFICATE OF TRANSMISSION**

I certify that I transmitted via facsimile to (571) 273-8300 the enclosed Amendment under 37 C.F.R. § 1.111 to Examiner VIP Patel, Art Unit 2879, on April 29, 2006.

  
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